

Precision Balance Series

User Manual

Analytical & Toploader Models

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V4.08 & above (Load Cell Models)

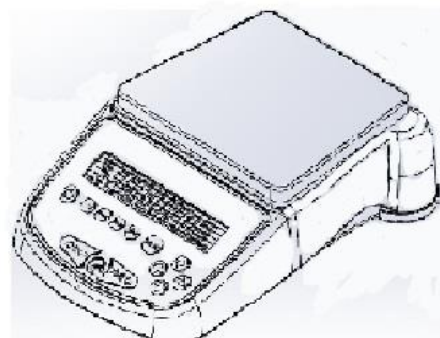
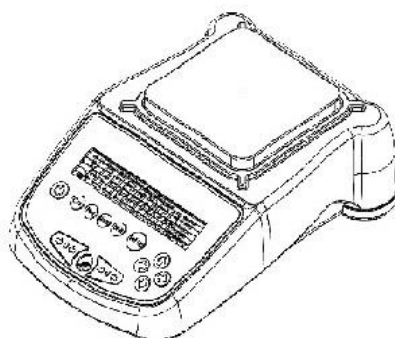
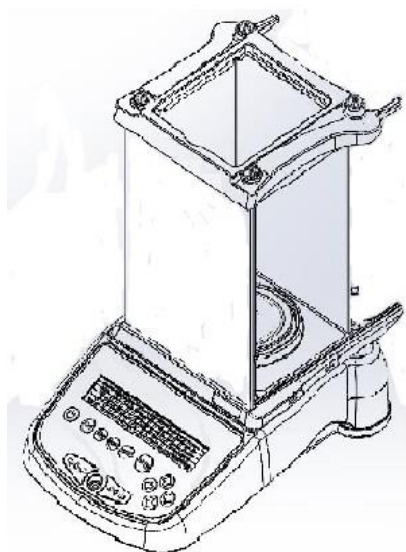


TABLE OF CONTENTS

1	KNOW YOUR BALANCE.....	3
2	PRODUCT OVERVIEW	4
3	SPECIFICATIONS	5
3.1	Precision Analytical Models.....	5
3.2	Precision Toploading Models.....	6
3.3	Toploading Models	7
4	UNPACKING & ASSEMBLING THE BALANCE	8
5	LOCATING THE BALANCE.....	11
6	SETTING UP THE BALANCE	12
6.1	First Steps	12
6.1.1	Levelling the balance	12
6.1.2	Warm-Up Time	12
6.2	CALIBRATION	12
6.2.1	Manual Calibration	12
6.2.2	Calibration using External Calibration mass	12
6.2.3	Automatic Calibration.....	13
6.2.4	Calibration Errors.....	13
7	DISPLAY	15
7.1	SYMBOLS AND TEXT.....	15
8	KEYPAD.....	16
8.1	NUMERIC ENTRY METHOD	17
9	INPUT/OUTPUT	18
10	OPERATIONS.....	19
10.1	INITIALISATION	19
10.2	PASSCODES	19
10.3	WEIGHING	20
10.4	FUNCTIONS	21
10.4.1	Parts Counting.....	22
10.4.2	Percent Weighing.....	23
10.4.3	Dynamic (Animal) Weighing.....	24
10.4.4	Density Determination	26
11	RS-232 INTERFACE	28
11.1	HARDWARE.....	28
11.2	STANDARD FORMAT.....	29
11.3	INPUT COMMANDS USING REMOTE KEYS.....	29
11.3.1	Invalid Input Command:.....	30
12	ERROR CHECKING	32
13	SUPERVISOR MENUS	33
13.1	ENABLE WEIGHING UNITS	33
13.2	ENABLE WEIGHING MODES.....	33
13.3	ENABLE SERIAL INTERFACE PARAMETERS	33
13.4	FORMAT OF CUSTOM FORMS #1 and #2.....	34
13.5	SETUP PARAMETERS.....	35
13.6	CALIBRATION SETUP	36
13.7	PASSCODES	37
14	PERIPHERALS	38
14.1	DENSITY DETERMINATION KIT	38
14.2	ANTI-VIBRATION TABLE	38
14.3	THERMAL PRINTER	38
14.4	REMOTE DISPLAY.....	38
15	SAFETY AND MAINTENANCE.....	39
16	TROUBLE-SHOOTING	39
16.1	TROUBLE-SHOOTING GUIDE.....	40
17	REPLACEMENT PARTS AND ACCESSORIES	43
18	SERVICE INFORMATION	44
19	BALANCE MENU STRUCTURE.....	45
20	WARRANTY INFORMATION	48

1 KNOW YOUR BALANCE

This Instruction Manual will familiarise you with the installation, use, general maintenance etc. of the balance, and will guide you through the various applications. It also covers accessories, trouble-shooting, after sales service information, and other important information.

These balances are highly accurate precision instruments and contain sensitive mechanisms and components. They should be transported and handled with care. When in operation, be careful to place loads gently on the weighing surface and do not overload or exceed recommended maximum capacity of the instrument or damage may occur.

Please read this Manual thoroughly before starting operation. If you need any clarifications, feel free to contact your supplier or manufacturer.

2 PRODUCT OVERVIEW

These balances are ideal for laboratory and general purpose weighing. They can also be used for some advanced weighing functions.

FEATURES:

- External menu-driven calibration allowing user-selectable range of calibration weights.
- Internal calibration (option) for outstanding accuracy without the need for manual calibration.
- Mains powered with some models offering rechargeable battery pack option for cordless use.
- Solid die-cast aluminium alloy construction with 304 grade stainless steel pan for durability and easy cleaning.
- Large easy to read LCD display with backlight.
- Standard applications include weighing, percentage weighing, parts counting, dynamic / animal weighing (some models), and solid and liquid density determination (some models).
- Bi-directional RS-232 interface as standard (with optional RS232 to USB convertor accessory), integrated USB interface (some models).
- Can be configured to print a GLP Compliant report after each calibration to include the time, date, balance number and a verification of the calibration.
- Force-restoration mechanism for supreme accuracy, or alloy load cell technology for stable yet accurate weighing.
- Automatic temperature compensation.
- Multiple weighing units.
- Easy to use, wipe-clean sealed membrane keypad.
- Below balance weighing facility.
- Display in up to 4 languages – English & German as standard. French & Spanish on some models.
- Password protection.
- Security locking point.

3 SPECIFICATIONS

3.1 Precision Analytical Models

(Suffix e for external calibration models, Suffix i for internal calibration models)

Model #	124	214	224
Maximum Capacity	120 g	210 g	220 g
Readability (d)	0.0001 g		
Number of intervals n=	1200000	2100000	2200000
Recommended min. weight	0.01 g		
Repeatability (Std. Dev)	0.00015 g	0.0002 g	
Linearity ±	0.0002 g		
Units of Measure	grams, milligrams, carats, grains, ounces, troy ounces, pennyweight, (some models feature mommes, custom unit).		
Stabilization Time	Typically 3 seconds		
Operating Temp	10°C to 40°C recommended		
Power Supply	External mains power adapter - supplied as standard (Input Voltage 100–240 VAC, 50/60 Hz)		
Input Voltage	18 VDC - 830 mA		
Weighing mechanism	Force Restoration Balance Motor		
Calibration	External calibration as standard, internal calibration optional		
External Calibration Mass	Fixed value: Recommended OIML class: E2, ASTM/ANSI class: 1		
	100 g	100 g or 200 g	
Display	LCD with blue backlight, 7 characters, 20 mm high, plus symbols		
Draft Shield (w x d x h)	Sliding door Draft Shield (132 x 142 x 233 mm)		
Pan Size	Round, 90mm diameter		
Overall Dimensions (w x d x h)	220 x 310 x 323 mm 8.7 x 12.2 x 12.7 in		
Net Weight	5.2 kg / 11 lb 8 oz		

3.2 Precision Toploading Models

(Suffix e for external calibration models, Suffix i for internal calibration models)

Model #	213	413
Maximum Capacity	210 g	410 g
Readability (d)	0.001 g	
Number of intervals n=	210000	410000
Recommended min. weight	0.1 g	
Repeatability (Std. Dev)	0.002 g	
Linearity $\pm$	0.002 g	
Units of Measure	grams, milligrams, carats, grains, ounces, troy ounces, pennyweight, (some models feature mommes, custom unit).	
Stabilization Time	Typically 3 seconds	
Operating Temp	10°C to 40°C recommended	
Power Supply	External mains power adapter - supplied as standard (Input Voltage 100–240 VAC, 50/60 Hz) Battery pack included with some models.	
Input Voltage	18 VDC - 830 mA	
Weighing mechanism	Precision Load Cell	
Calibration	External calibration as standard, internal calibration option.	
External Calibration Mass	Fixed value: Recommended OIML class: E2, ASTM/ANSI class: 2	
	100 g, 200 g	200 g, 400 g
Display	LCD with blue backlight, 7 characters, 20 mm high, plus symbols	
Draft Shield (w x d x h)	Square toughened glass draft shield With alloy Lid (160 x 160 mm)	
Pan	Square 304 stainless steel, 130 X 130 mm	
Overall Dimensions (w x d x h)	220 x 310 x 90 mm without breeze shield 8.7 x 12.2 x 3.5 in	
Net Weight	3.1 kg / 6 lb 12 oz	

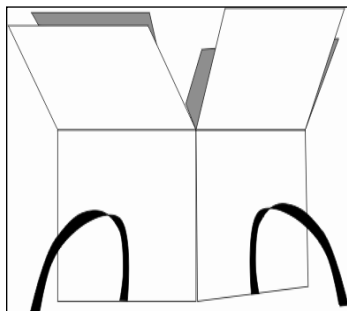
3.3 Toploading Models

(Suffix e for external calibration models, Suffix i for internal calibration models)

Model #	2202	4202	5001	10001	15001
Maximum Capacity	2200 g	4200 g	5000g	10 kg	15 kg
Readability (d)	0.01 g	0.01 g	0.1g	0.1 g	0.1 g
n=	220000	420000	50000	100000	150000
Min	0.2 g		2 g		
Repeatability (Std. Dev)	0.02 g		0.2g		
Linearity ±	0.04 g		0.4g		
Units of Measure	kilograms, grams, carats, grains, ounces, troy ounces (some models feature pounds, ounces, lb:oz, mommes, custom unit).				
Stabilization Time	Typically 3 seconds				
Operating Temp	10°C to 40°C recommended				
Power Supply	External mains power adapter - supplied as standard (Input Voltage 100–240 VAC, 50/60 Hz) Battery pack included with some models.				
Input Voltage	18 VDC - 830 mA				
Weighing mechanism	Precision Load Cell				
Calibration	External calibration as standard, internal calibration optional		External calibration as standard		
External Calibration Mass	Fixed value: Recommended OIML class: F1, ASTM/ANSI class: 3		Fixed value: Recommended OIML class: F2, ASTM/ANSI class: 4		
	1 kg, 2 kg	2 kg, 4 kg	2 kg, 5 kg	5 kg, 10 kg	
Display	LCD with blue backlight, 7 characters, 20 mm high, plus symbols				
Draft Shield (w x d x h)	None				
Pan Size	Trapezoidal, 165 mm X 180 mm sides				
Overall Dimensions (w x d x h)	220 x 310 x 90 mm 8.7 x 12.2 x 3.5 in				
Net Weight	3.4 kg / 7 lb 8 oz				

4 UNPACKING & ASSEMBLING THE BALANCE

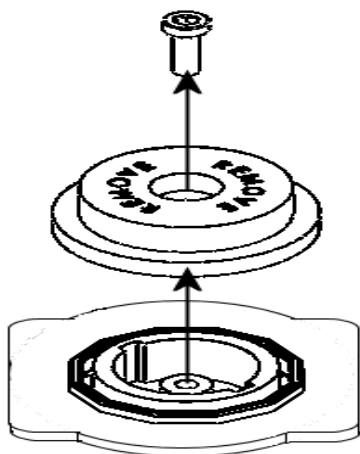
Remove the balance from the packing by carefully lifting it out of the box. Inside the box you will find everything needed to start using the balance.



- AC mains power adapter & cord
- Stainless Steel Top Pan
- Alloy sub-pan
- Draught shield (for mg models only)
- User documentation

Locate the balance on a solid surface, free from vibration.

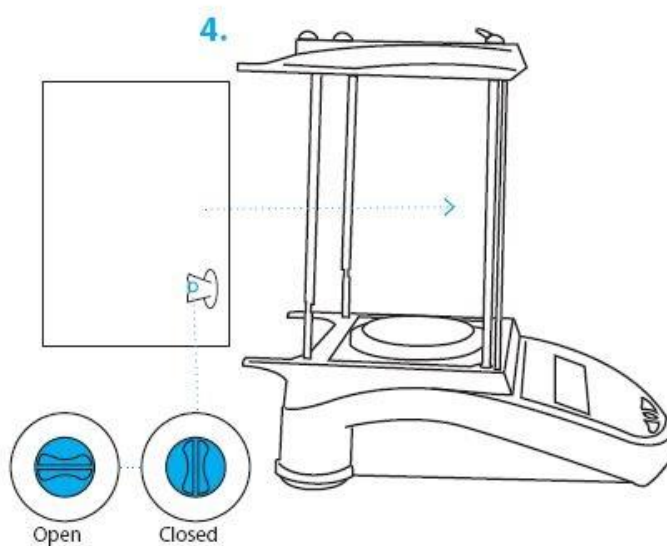
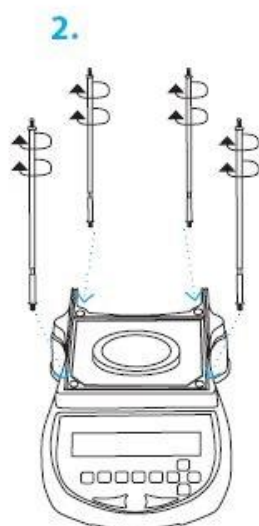
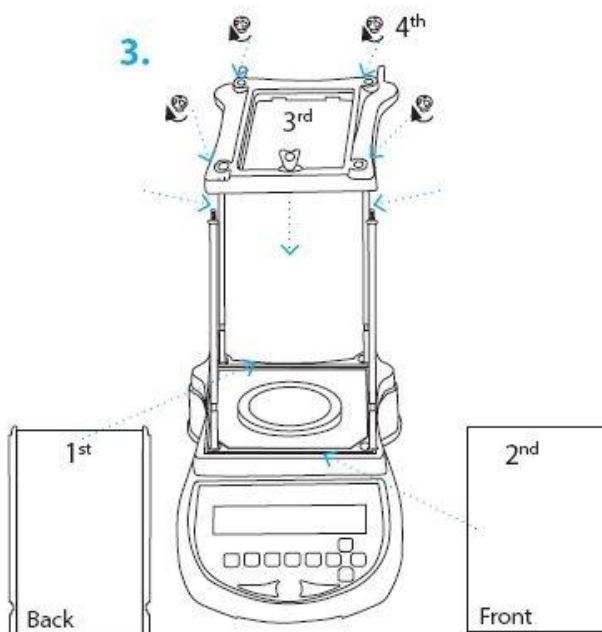
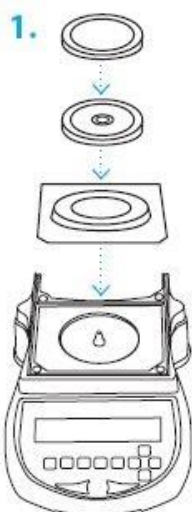
For some models, remove the shipping protection screw and transit disc from the top of the balance and place the top pan support on the balance. Do not use excessive force when removing and installing the screw.



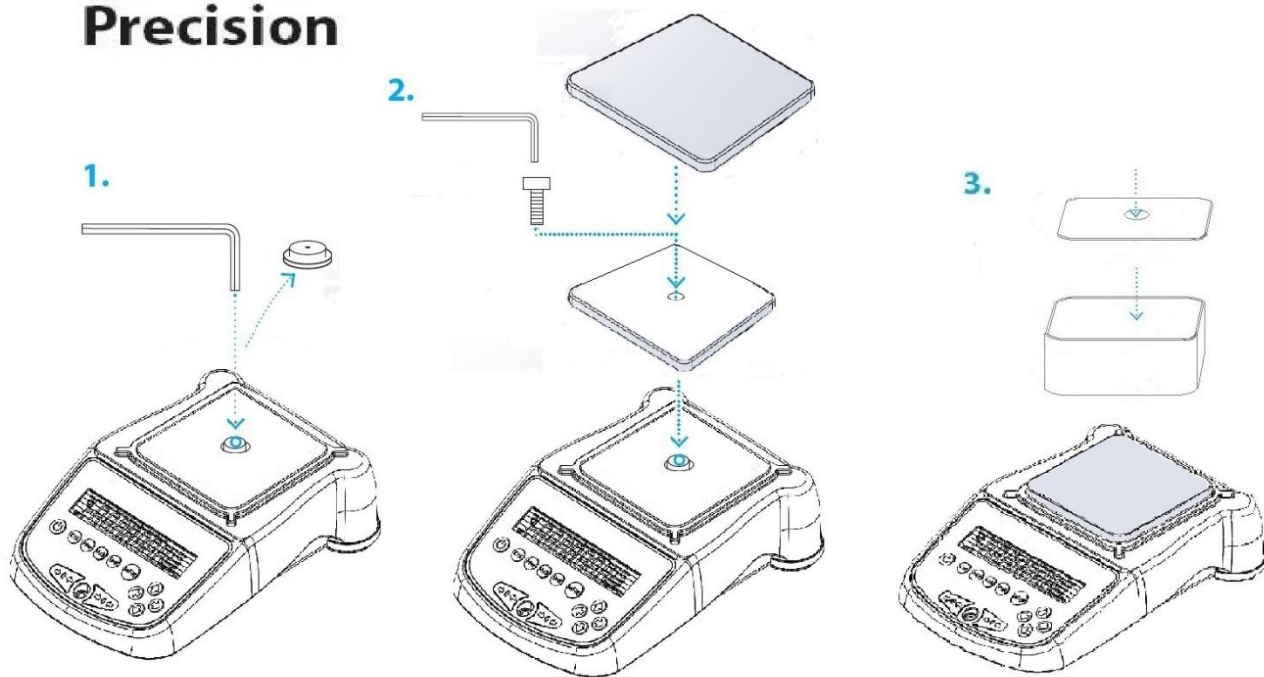
Gently place the pan support into the receptacle and secure with the supplied screw. To not over-tighten the screw. It should be finger tight only. Put the Stainless steel pan on top of the pan support.

If supplied, place the draught shield frame and the top cover around the pan.

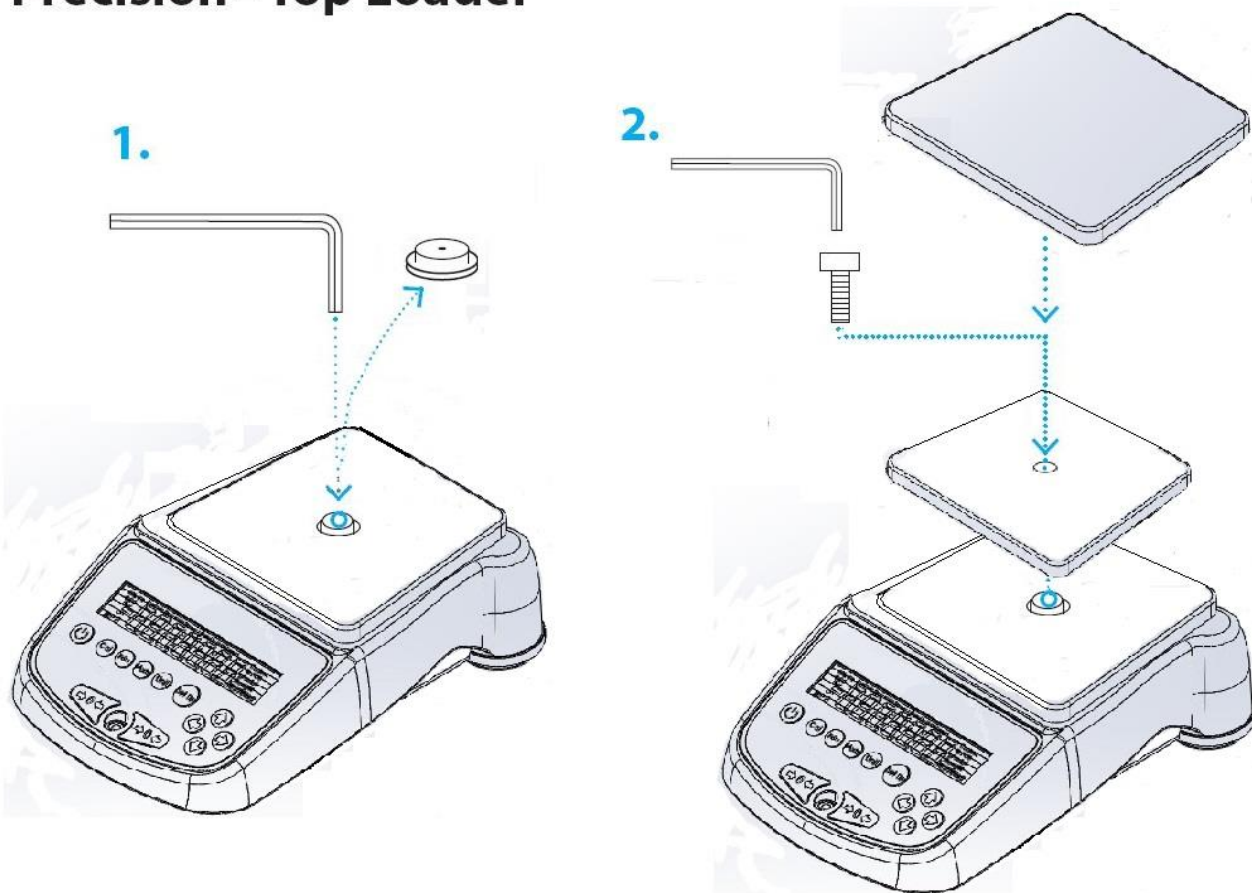
Set Up Analytical



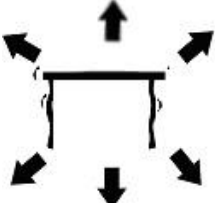
Precision



Precision - Top Loader



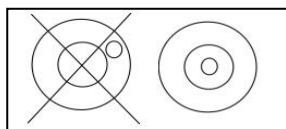
5 LOCATING THE BALANCE

	The balance should not be placed in a location that will reduce the accuracy. Avoid extremes of temperature. Do not place in direct sunlight or near air conditioning vents.
	Avoid unsuitable tables. The table or floor must be rigid and not vibrate. Avoid unstable power sources. Do not use near large users of electricity such as welding equipment or large motors.
	Do not place near vibrating machinery. Avoid high humidity that might cause condensation. Avoid direct contact with water. Do not spray or immerse the balances in water. Avoid air movement such as from fans or opening doors. Do not place near open windows or air-conditioning vents.
	Keep the balance clean. Do not stack material on the balances when they are not in use.

6 SETTING UP THE BALANCE

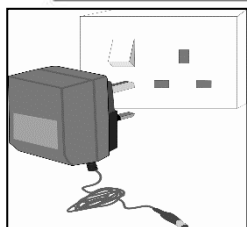
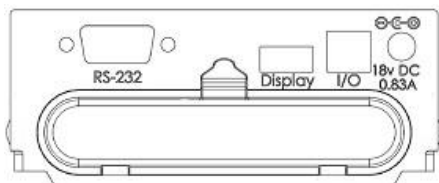
6.1 First Steps

6.1.1 Levelling the balance



After placing the balance in a suitable place, level it by using the spirit level on the front of the balance. To level the balance, turn the two adjustable feet at the rear of the balance until the bubble in the spirit level is centred.

6.1.2 Warm-Up Time



Insert the power supply cable DC connector to the connector on the rear of the balance. Plug the power supply module into the mains. The display will indicate the balance serial number (if set) and the software revision number, followed by the capacity of the balance. Next the balance will run a self-test by displaying all segments followed by a symbol indicating the balance is in busy mode. If the balance serial number is not set the display will show dashes. The display will show zeroes accompanied by the $\rightarrow 0 \leftarrow$ symbol.

Before you start weighing, you have to wait for the balance to achieve a stable internal temperature.



A stable sign $\sim$ is shown when the balance is in stable condition. It will turn off if the balance is not stable. Exact zero is shown when the $\rightarrow 0 \leftarrow$ symbol is visible on the left of the display area.

6.2 CALIBRATION

Units with an 'i' suffix can be calibrated using either internal calibration mechanism or by using an external mass. Units with an 'e' suffix can only be calibrated with an external mass. Internal calibration option must be enabled in the setup menu options or else external calibration mode will be used when the **[Cal]** key is pressed.

6.2.1 Manual Calibration

Pressing the **[Cal]** key will start calibration. Calibration can also be initiated by a change in internal temperature or a set time period as determined by the user.

Pressing **[$\rightarrow 0/T \leftarrow$]** will abort the calibration at any time

6.2.2 Calibration using Internal Calibration mass (if fitted)

On pressing the **[Cal]** key the display will show the busy symbol and a line of dashes and then after a few seconds will display '**CALibrA**'. Then the busy symbol and a line of dashes will reappear, followed by '**CAL On**'. Then '**CALibrA**' will appear again, followed by the busy symbol and a line of dashes. Finally '**CAL OFF**' will be displayed, followed by a beep and the busy symbol and a line of dashes. A final beep will sound the end of calibration and the display should return to '**0.000 g**' or similar. Internal calibration is now complete and normal operations may be continued.

6.2.3 Calibration using External Calibration mass

Note: *Calibration mass used should be a known accurate item, ideally with an OIML or ASTM/ANSI classification appropriate to the accuracy of the balance.*

On pressing the **[Cal]** key the display will show the balance setting a new Zero condition by showing "**LOAD 0**". Make sure the pan is empty then press the **[Setup]** key to continue

The display will show the busy symbol and a line of dashes and then after a few seconds will display the default calibration mass. For example, for a "213" model (210g capacity, 1mg readability) the display will be "**200 g**" where 200 g is the default calibration mass.

Place the selected mass on the balance. The balance will automatically continue. The display will show the busy symbol and a line of dashes and after calibration is complete it will sound a beep and display "**unLOAD**". Remove the weight. Another beep will be heard confirming the unloading action. The balance will display the busy symbol and a line of dashes for a few seconds and then sound a beep and return to normal weighing.

6.2.4 Automatic Calibration

The balance has the ability to ask for calibration when the balance has automatic calibration enabled and the conditions of the automatic calibration have been met.

Conditions that will cause an automatic calibration are:

- Internal temperature change greater than a pre-set amount (typically 2°C for Precision balances).
- Time since last calibration exceeds a pre-set time (typically 4 hours, or 15 minutes after power is applied).

The balance will call for calibration to be carried out by flashing the "CAL" symbol on the display. As soon as the balance is calibrated the symbol will be turned off.

The Auto calibration feature can be enabled, disabled or changed within the user options to meet the requirements of the users.

6.2.5 Calibration Errors

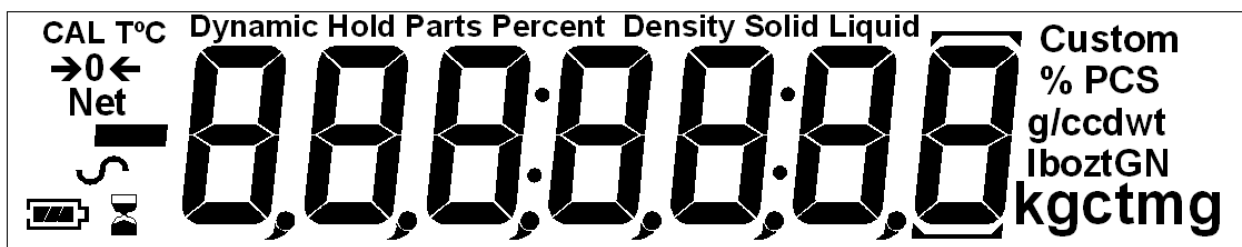
Occasionally during calibration an error will be detected. These errors can be caused by:

- Unstable readings
- Improper calibration weights being used

- Large shifts of zero from the factory settings

When an error is found a displayed message will be shown and the calibration must be done again. If the balance has error messages more than once it is possible the mechanics have been damaged.

7 DISPLAY



The LCD has several areas-

A large 7 digit area to display the weight with symbols for common weighing units on its right and symbols for zero, tare (Net) and stability on the left.

Text to show the current operation of function being used.

7.1 SYMBOLS AND TEXT

The LCD has unique symbols to indicate the following:

→0←	Zero
	Busy
	Stable
g, mg, kg, ct, dwt, GN, ozt, oz, N, Custom, g/cc, Pcs, %,	Symbols shown for units and modes
	Battery charge symbol

Indicators:

"CAL"	When calibration is occurring or about to occur
"T"	For a time driven calibration
"°C"	When a temperature is shown or a temperature driven calibration is to occur
"Net"	When a net weight is shown
"Dynamic"	When the balance is in the dynamic / animal weighing mode
"HOLD"	When the balance is displaying dynamic weighing result
"Parts"	When the balance is in the Parts counting mode
"Percent"	When the balance is in the Percent weighing mode
"Density Solid"	When the balance is in the Solid Density mode
"Density Liquid"	When the balance is in the Liquid Density mode

8 KEYPAD

(Design may vary slightly)



The keypad has the following keys to operate the balance.

Keys	Primary function
	[POWER] To turn the balance to ON or Standby
[→0/T←]	[→0/T←] A combined zero and tare function. To escape from setup functions and modes.
[Cal]	[Cal] Starts the calibration function
[Print]	[Print] Instructs the balance to print data
[Mode]	[Mode] Enters the Mode Selection Menu
[Unit]	[Unit] Selects weighing units by cycling through a set of enabled units.
[Setup]	[Setup] Enters the setup parameters (Supervisor Menus). Enters a function or saves a value while manually entering unit weight or check weighing limits.

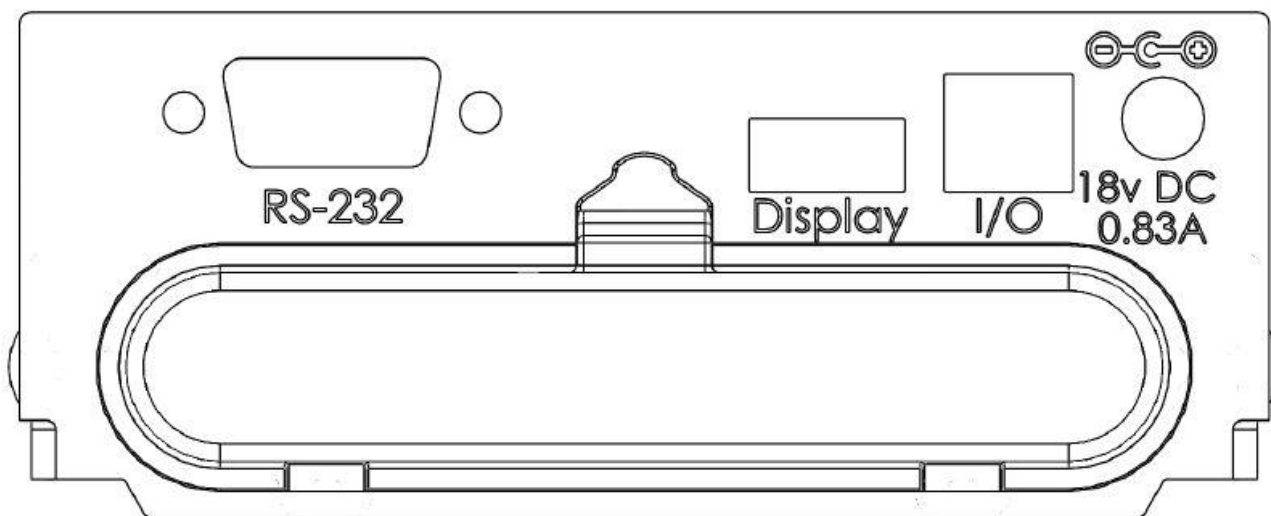
	[Down] To decrement or change a displayed value or scroll through options backwards
	[Right] To advance a flashing digit by one position to the right. To go back by one step during setup functions
	[Left] To advance a flashing digit by one position to the left
	[Up] To increase or change a displayed value or scroll through options forward

8.1 NUMERIC ENTRY METHOD

To set a value when required, use the keys as given below-

[Up] and **[Down]** symbol keys to increase or decrease the flashing digit,
[Right] and **[Left]** symbol keys to advance or move back the digit and
[Setup] key to accept the value

9 INPUT/OUTPUT



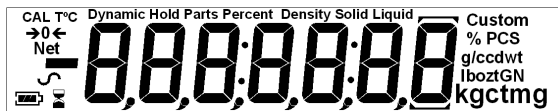
The rear panel has the following connectors:

- RS-232 serial - 9 pin d-subminiature plug.
- Remote display connector (USB type A socket).
- I/O connector (USB type B socket).
- Power input socket. (Required power input is a low-voltage external supply, 18VDC @ 830mA for all models). Accepts concentric barrel plug 11.4mm length X 5.5mm outside diameter X 2.1mm centre diameter.

There is also a battery cover and slot for the rechargeable NiMH battery pack (if available with your model). Due to the high power requirements of the analytical balance weighing mechanism and the internal calibration mechanism, it is not recommended to use battery power for these options.

10 OPERATIONS

10.1 INITIALISATION



When the balance is first switched on, it will display the balance serial number (if set), software revision, the model capacity and then all segments on the display will be shown. Overall the time taken is usually 5 -10 seconds.

If an operator passcode has been set, the display will show “PC - - - -”. In this case you must enter the passcode to continue using the numeric entry method (see section 7.1). A different passcode may be set for a Supervisor to weigh or to have access to the selected User menus. If the passcode has not been set the balance will continue as below.



The display will show zero reading along with the zero symbol “→0←” and the weighing unit last used. If automatic time calibration is enabled the balance will calibrate 15 minutes after power up or again after the pre-set time interval.

10.2 PASSCODES

If a passcode has been set to limit access to the weighing functions of the balance the display will show “PC - - - -”. Use the numeric entry method (see section 8.1) to enter the code. The display show the digits entered as they are set. The active digit will have the “-“ flashing. Make sure to enter the correct passcode to continue. See the Section 13.6 for details.

10.3 WEIGHING

Press [**→0/T←**] to zero the balance if required, “**→0←**” will be displayed

Place a mass on the pan and the weight will be displayed

If a container is used, press [**→0/T←**] to tare the balance when the balance symbol “~” is on. “**Net**” will be displayed to indicate that the balance is tared.

When the display shows zero, place the item to be weighed. Only the net weight will be displayed.

At any time the [**Unit**] key may be pressed to select another unit. Use the [**Up**] or [**Down**] keys to scroll through the units and select the desired unit by pressing [**Setup**], the display will change to show the weight in the selected weighing unit. The available weighing units can be enabled or disabled by the user (see section 13.1). Only weighing units that have been enabled will be cycled through when [**Unit**] is pressed.

Weighing Units:

Note: Approved units have restricted range of units available.

You can select alternative weighing units to display the weight by pressing the [**Unit**] key. The available weighing units are:

	Unit	Symbol	Models	Conversion Factor 1g =	Conversion Factor 1 unit = grams
1	GRAMS	g	All	1	1.0
2	MILLIGRAMS	mg	not 0.01g units	1000	0.001
3	KILOGRAMS	kg	0.01g & 0.1g units	0.001	1000
4	CARATS	ct	All	5	0.2000
5	PENNYWEIGHT	dwt	All	0.643014865	1.555174
6	GRAINS	GN	All	15.43236	0.0647989
7	TROY OUNCES	ozt	All	0.032150747	31.103476
8	OUNCES	oz	All	0.035273962	28.349523
9	POUNDS	Lb	0.01g & 0.1g units	0.00220462	453.59237
11	CUSTOM	Custom	All	As specified	As specified

It is possible to set the balance to display only grams. Grams will always be one of the units enabled, by default.

If “Custom” unit is selected, the balance will prompt for entering a multiplier by displaying “CF 1.2345”, where “1.2345” is the last stored value. Any value ranging from 0.100 to 10.000 may be entered, by which the weight in grams will be multiplied before being displayed. If a multiplier of greater than 1.000 is entered, the number of decimal places displayed will be reduced by one. This multiplier value will be saved for the next use until it is changed by the user.

The balance displays the alternate weighing units with as much precision as possible. For example, the 410g capacity balance (410g x 0.001g) could weigh up to:

Unit	Maximum	d =
g.	410.000	0.001
mg	410000	1
kg	0.410000	0.000001
ct.	2050.000	0.005
dwt	263.6360	0.001
GN	6327.260	0.02
ozt	13.18180	0.00005
oz	14.46230	0.00005
Lb	0.90389	0.00001

10.4 FUNCTIONS

When weighing, the user can access the applications that have been enabled (see section 13.2).

The following applications are available depending on model:

Weighing

Parts counting

Percent weighing

Animal / dynamic weighing

Density determination

The selectable functions can be enabled using a similar method to the Units above by turning the functions on or off.

10.4.1 Parts Counting

This allows the user to weigh a sample of parts to compute an average unit weight and then determine the number of items being weighed by dividing the net weight by the unit weight value. The result is always a whole number of parts.

The balance will have a preset number of parts to be used as a sample. These values are 10, 25, 50 or 100 items.

Steps:

Press **[Mode]** to show parts counting, "**Parts**" will be displayed

Enter parts counting by pressing **[Setup]**

Press the **[Up]** or **[Down]** key to select the sample size, "**SP XX^{PCS}**", XX=10, 25, 50, 100, etc., then press **[Setup]** to confirm

When "**Ld XX^{PCS}**" is shown, place XX number of items on the pan and press **[Setup]** to compute the average piece weight. Display will indicate the total weight in the last selected unit and then show "**XX Pcs**" sounding a beep. A message "**Parts**" will be prompted on the top of the display to indicate that the balance is in the parts counting mode

Remove the sample and display will show "**0^{PCS}**".

Place an unknown quantity on the pan. The balance will then compute the number of parts based on the average piece weight. The display will show the result in Pcs

To count another item press **[Mode]** and continue as before.

Checks will be made to determine that the weight of the reference parts is large enough for reasonably accurate counting (weight of each piece must be > 1d)

To return to normal weighing, press **[→0/T←]**.

10.4.2 Percent Weighing

Percent weighing will be done by defining a certain weight to be 100%. The weight to be used can either be entered by the user or taken from a sample

Press **[Mode]** and then the **[Up]** or **[Down]** key to select Percent weighing, “Percent” will be displayed

Press **[Setup]** to enter the function

Display will show, “**SAmPLE** %”

Press **[Setup]** to select the sample method or scroll to manually enter the sample weight as given below

When “**LOAD 100 %**” is shown, add the sample

Press **[Setup]** to set this weight to be 100%. The display will show “**REF WT**” and the sample weight in the last selected unit. After a while “**100 %**” will be displayed. “Percent” will be shown on the top of the display to indicate that the balance is in the percent weighing mode

Remove the sample and “**0.00 %**” will be displayed

Place an unknown sample on the pan to display the percentage weight.

To set another weight as 100%, press **[Mode]** and continue as before

To manually enter a value to be set as 100%, press **[Up]** or **[Down]** key when “**SAmPLE**” is shown to select “**Ent Wt**”

Press **[Setup]**. Display will show a value in the unit last used in the weighing mode

Enter the weight using the direction keys and numeric entry method.

Place unknown sample to display the percentage weight

To perform percent weighing with another sample press **[Mode]** and continue as before.

To return to normal weighing, press **[→0/T←]**

NOTE: Percentage will be initially displayed to the maximum number of decimal places based on the resolution of the balance. To increase or decrease by one decimal place, press the **[Up]** or **[Down]** key respectively.

10.4.3 Dynamic (Animal) Weighing

The balance can be set to weigh animals or moving items, also known as dynamic weighing. The balance will collect the weight over a period of time to arrive at an average value and display the value until the operator resets the balance. The actual weighing process can begin either automatically when the weight is placed on the pan or when initiated by the operator. The weighing unit can be selected as normal using the **[Unit]** and **[Setup]** keys, before entering the dynamic weighing process.

Steps:

Press **[Mode]** and then the **[Up]** or **[Down]** key to select **Dynamic** (Animal Weighing). When “Dynamic” is displayed press **[Setup]** to enter the dynamic weighing mode

Press **[Up]** or **[Down]** to select “rUN” for starting the dynamic weighing using the method previously set, or “SEtuP” to set up the balance for animal weighing (see the section on Dynamic Weighing Setup Parameters)

10.4.3.1 MANUAL MODE

When the balance is in the MANUAL mode –

If **[Setup]** is pressed when “rUN” is selected, balance will display “StArt ”

Place the item on the pan and press **[Setup]** again

After the configured Delay and test time are computed by the balance, the result will be displayed by showing “Hold” after a pre-set time Delay and Sampling period (see the section Dynamic Weighing Setup Parameters)

10.4.3.2 AUTO MODE

When the balance is in the AUTO mode –

If **[Setup]** is pressed when “rUN” is selected, balance will display “LOAD”

Place the item on the pan. The animal weighing test will begin automatically

After the configured delay and test time are computed by the balance, the result will be shown displaying “HOLD” (see the section on Dynamic Weighing Setup Parameters)

During animal weighing, if the **[Print]** key is pressed, the balance will display “PAUSED” for 1 second then show the current average weight with the “Dynamic” indicator flashing.

To resume, press **[Print]** again or

Pressing **[Mode]** will display “StOP” for one second then show the final value. The value will be locked until the user releases it.

Remove the item from the pan.

Press **[Mode]** to go back to “rUN” to weigh another item or **[→0/T←]** to return to normal weighing.

10.4.3.3 Animal Weighing Setup Parameters

Press **[Mode]** and then **[Up]** or **[Down]** to select Animal Weighing. When “Dynamic” is displayed press **[Setup]** to enter the function

Press the **[Up]** or **[Down]** key to select “SEtuP”

Press **[Setup]** to select “SEtuP” to set up the balance for animal weighing

Use the **[Up]** or **[Down]** key to scroll through the options for setting up the mode. The display will show “AUtO” or “mAnUAL”.

Select “mAnUAL” or “AUtO”

If “AUtO” is selected-

Thres**HOLD** (For AUTO mode only)

The display will next show “TH XX” where **XX** is the minimum weight of the item required by the balance to start the process for animal weighing. The value will be shown in the last selected unit.

The value **XX** can be changed from 1 to 99 grams using the keypad numeric entry method.

To confirm the desired value, press **[Setup]**

10.4.3.4 Test time

After **[Setup]** is pressed to select “mAnUAL” or “AUtO”, it will display “tlmE XX”, where **XX** is the number of seconds over which the balance will average to compute the final weight as set during last operation

The value **XX** can be changed to between 10-99 seconds using the keypad numeric entry method.

To confirm the desired value, press **[Setup]**

Delay

Next, the display will show “dLY XX” where **XX** is the time in seconds taken by the balance before the sampling starts.

The value **XX** can be changed to between 0-99 seconds using the keypad numeric entry method.

To confirm the desired value, press **[Setup]**

10.4.4 Density Determination

It is possible to determine the density of solids or liquids using this mode. The user selects the type of density to be determined and then enters values to be used by the balance.

The density mode allows the user to use a special Density Kit or use the below pan weighing facility to perform the necessary weighing.

10.4.4.1 Density of Solids

To perform the density of solids test, the user must have a method to immerse the sample in the chosen liquid. The density of the liquid must be known or determined from a look-up table.

For water and ethanol the density will be calculated based on the temperatures entered using the keypad numeric entry method.

Steps:

Press **[Mode]** and then **[Up]** and **[Down]** keys to select “Density Solid” or “Density Liquid”

Press **[Setup]** to enter Density mode.

If “Density Solid” was selected, the type of liquid used for the test must be selected.

Press **[Up]** or **[Down]** to select the liquid – water (display “**wAtEr**”), ethanol (“**EtHAnOL**”), or other (“**OtHEr**”).

For the “Other” choice the density will be asked for. Enter the density (g/cc) using the numeric entry method (see section 7.1). The display will show “ **XX.XXX g/cc**”

Press **[Setup]** to continue.

The balance will request the weight of the sample in air by displaying “**Air wt**”. Place the item on the pan, or in receptacle if the density kit is used, and press **[Setup]**. The weight will be shown in the last weighing unit selected.

After completion of the air weighing, the balance will request the weight in liquid by displaying “**Liq wt**”. Submerge the item in the liquid and press **[Setup]** to start the liquid weighing. After completion of the liquid weighing, the balance will compute the density of the sample and display it as “**XXXX g/cc**”.

Remove the item from the pan and press **[Mode]** to continue with a new sample or press **[→0/T←]** to return to normal weighing.

10.4.4.2 DENSITY OF A LIQUID

When finding the density of a liquid, it is necessary to weigh a sample of known volume in air and then in the liquid. The volume of the sample must be entered by the user. The last known volume is stored for use at any time.

If using the density determination kit, the volume of the plumb is marked on its support, i.e. 10.123.

Steps:

Press **[Mode]** and then **[Up]** and **[Down]** to select “Density Liquid”.

Press **[Setup]** to select the Liquid Density mode

Use **[Up]** and **[Down]** to scroll through the solid or liquid method

The volume will be asked for. Enter the volume using the keypad numeric entry method, or continue using the last volume entered. The display will show “V XX.XXX”

Press **[Setup]** to continue

The balance will request the weight in air by displaying “Air Wt”. Place the glass plumb supplied with the density determination kit in air on the weighing pan and press **[Setup]** to start the air weighing. The value will be shown in the last weighing unit selected.

After completion of the air weighing, the balance will request the weight in liquid by displaying “LIQ Wt”. Submerge the glass plumb in the liquid and press **[Setup]** to start the liquid weighing. The weight will be shown in the last selected unit. After completion of the liquid weighing, the balance will compute the density of the liquid and display it as “XXXX g/cc”

Remove the item from the pan

Press **[Mode]** to continue with a new sample or press **[→0/T←]** to return to normal weighing.

Pressing **[Print]** will print the density value in g/cc.

11 RS-232 INTERFACE

The balances have the ability to send or receive data over the serial interfaces, RS232 and USB. Both interfaces are controlled by the following parameters. An additional interface is available to operate with the Remote Display unit.

The USB and RS232 are general purpose serial ports so that the weighing data can be sent over the interface either automatically or when the user presses the [Print] key.

11.1 HARDWARE

The RS-232 interface is a simple 3 wire connection. The input and output connections are:

Connector: 9 pin D-sub miniature socket

Pin 2 input to balance RXD

Pin 3 output from balance TXD

Pin 5 Signal ground GND

Handshaking is not applied.

Baud rate: 4800, 9600, 19200, 38400

Parity: NONE (=8N1), EVEN (=7E1) or ODD (=7 O 1)

All lines are terminated with carriage return and line feed (<CR><LF>).

In continuous output mode, or if single-line output on demand is selected, the serial output format will be a single line in the form "1234.567 g<CR><LF>".

The format of the single-line output will change depending on the mode in which the balance is operating, as described below.

If output on demand is selected, the user may optionally configure the serial output as a choice of 3 styles of form, either in a default format or in one of two custom formats. Each of the custom formats can be configured to output up to 15 lines of data. The data types that can be printed are:

NAME	TEXT PRINTED
ID number	ID no.: xxxxxxxxxxxxx
Serial number	Serial no. xxxxxxxxxxxxx
Date	DATE dd/mm/yyyy
Time	TIME hh:mm:ss
Net weight	Net: xxx.xxx g
Gross weight	Gross: xxx.xxx g
Tare weight	Tare: xxx.xxx g
Unit weight	Unit wt: xxx.xxx g
Count	Count: xxxx pcs
Reference weight	Ref. wt: xxx.xxx g
Percent	Percent: xx.xxx %

Checkweigh lower limit	Low: xxx.xxx g
Checkweigh upper limit	High: xxx.xxx g
A blank line printed	<CR><LF> only.

Any of these can be printed on any of the 15 lines available. Not all items need to be used and any one can be used more than once (see section 13.3).

The data for each form will be preceded by a start-of-header <SOH> character (01) and terminated with an end-of-transmission <EOT> character (04). These characters will be ignored by a serial printer but will allow a computer program which reads the data to distinguish between this block report format and the single-line output format described above.

11.2 STANDARD FORMAT

The balance will print the following data as the standard form. The standard form cannot be changed. The format of the custom forms #1 and #2 will be the same as the standard form until modified by the user.

Line 1	Date
Line 2	Time
Line 3	Blank line
Line 4	ID number
Line 5	Blank line
Line 6	Result
Line 7	Blank line
Line 8	Blank line

This will result in a printout that looks like:

Date:	23/09/04
Time:	15:45:27
ID No:	123456
Net:	123.456 g

*NOTE: The format of the results line will change depending on the mode in which the balance is operating, e.g.

Normal weighing, Check weighing, Animal weighing: "123.456 g"

Parts counting: "1234 pcs"

Percent weighing: "12.345 %"

11.3 INPUT COMMANDS USING REMOTE KEYS

The balance can be controlled with the following commands sent using remote keys such as from a PC. The commands must be sent in upper case letters, i.e. "KT" not "kt". Press

the Enter key of the PC after each command (the action of Carriage Return is denoted as <CR> as shown below).

Basic Input Commands:

!KT<CR>	Tares the balance to display the net weight. This is the same as pressing the [Zero / Tare] key when the balance is in the normal weighing mode.
!KS<CR>	Enters the setup section. This is the same as pressing the [Setup] key when the balance is in the normal weighing mode. Once entered the setup section, the balance can be controlled remotely using the Input Commands (as mentioned in this table) which will perform the same key functions as described in section 13.0.
!KP<CR>	Transmits data over RS-232 interface. This is the same as pressing the [Print] key when the balance is in the normal weighing mode.
!KM<CR>	Enters the Modes section. This is the same as pressing the [Mode] key when the balance is in the normal weighing mode.
!KC<CR>	Enters the Calibration section. This is the same as pressing the [Cal] key when the balance is in the normal weighing mode.
!KU<CR>	Enters the Unit selection section. This is the same as pressing the [Unit] key when the balance is in the normal weighing mode.

11.3.1 Invalid Input Command:

If an invalid command is received, then the command is returned as follows-

Invalid Command	Message returned	Remarks
!INT<CR>	!EU<CR>	Command character is not 'K'
!KK<CR>	!EK<CR>	Key character is not 'T', 'S', 'P', 'M', 'C' or 'U'
!KT-<CR>	!EF<CR>	Command format error, <CR> is not the fourth character
KT<CR> or !KT -	No reply	Either '!' or <CR> is missing in the command string

When the remote display output is used with the Remote Display unit, the output is a continuous stream of data representing the weight and other information to display the correct data on the remote display.

If the remote display data stream format is required for development purposes then please contact the manufacturer for advice.

12 ERROR CHECKING

During weighing the balance is constantly checking to see if it is operating within the limited parameters. The errors likely to occur are:

A/D counts below lowest allowed value
A/D counts above highest allowed value
A/D not operating
Maximum capacity exceeded

Other errors may be detected during special functions or operations. These will be described in the section that applies.

Error messages and the reasons are:

Concerning A/D counts	
Err UL	A/D counts below a limit
Err OL	A/D counts above a pre-set limit
Concerning calibration	
Err Stb	Calibration could not be completed because the results were not stable
Err LO or Err HI	Calibration constant not within 20% of old calibration constant
Concerning weighing	
Err LO	Weight display is below zero by >4%max
Err HI	Weight is above maximum plus 90d

13 SUPERVISOR MENUS

Pressing the **[Setup]** key while in normal weighing gives access to the menus.

When **[Setup]** is pressed and the Supervisor Passcode is not enabled the display will show the Supervisor menus. If passcode is enabled, the balance will ask for it by displaying "PC - - - -"

If a wrong code is entered an "Err PC" message will flash and the balance will return to weighing mode

If the passcode has been enabled and entered, the balance will allow the operator to access the Supervisor's menus by which the user can enable/disable weighing units or modes, set balance parameters for the conditions, set time and date, set parameters for the RS-232 interface, calibration parameters and security parameters

The display will show the first menu item "UnitS". The **[Up]** and **[Down]** keys will cycle through the main menu items, pressing the **[Setup]** key will enter the sub-menu or options can be set. Press **[Mode]** to come out of a sub-menu or **[→0/T←]** to return to normal weighing

13.1 ENABLE WEIGHING UNITS

When "UnitS" is displayed, press **[Setup]**. The display will show the symbol for the first unit, e.g. carats, ct, together with its enable state "OFF" or "On". The user can then enable or disable the carats unit by using **[Up]** or **[Down]**. Pressing **[Setup]** will confirm the setting and will advance to the next weighing unit. Repeat for each weighing unit in turn. Gram is always enabled

Press **[Mode]** to advance to setting of the next menu or press **[→0/T←]** to return to normal weighing

13.2 ENABLE WEIGHING MODES

The same steps are followed to enable or disable the weighing modes:

Press **[Setup]** when "MODS" is displayed. The display will show the first mode i.e., Parts Counting ("Parts") together with its enabled state "OFF" or "On". The user can enable or disable the parts counting mode by using **[Up]** or **[Down]**. Pressing **[Setup]** will confirm the setting and will advance to the next weighing mode. Repeat for each mode in turn

Press **[Mode]** to advance to setting of the next menu, or press **[→0/T←]** to return to normal weighing

13.3 ENABLE SERIAL INTERFACE PARAMETERS

The parameters affecting the serial **SEtuP** are set in a similar manner to the other parameters.

Press [**Setup**] when “**SEriAL**” is displayed to enter the sub-menu.

The parameters that can be set are:

EnAbLE	The serial port can be set to On or OFF
bAUd	Set the Baud Rate to 4800, 9600, 19200 or 38400, the default rate being 4800
PAritY	Set the Parity to nOnE, EVEn or Odd
StAbLE	To print when stable (On) or regardless of stability (OFF)
COntin	Set the RS-232 to send data continuously to On or OFF
PEriOd	Set the RS-232 to send data periodically (set in seconds) to On or OFF. If On is selected, the value can be changed between 1 and 999 seconds, using [Up] and [Down]
FOrmAt	To send data as a single line of data, using the standard format or using a customer designed format (FORM 1 or FORM 2).
REMOTE	To enable the remote display. Select ON for the remote display operation, or OFF to disable the remote display. ON is default.

13.4 FORMAT OF CUSTOM FORMS #1 and #2

If FORM1 or FORM2 is selected, it can be changed by the user using a selection of available data. By default the 2 forms are the same as the standard form unless changed by the user as below.

When FORM 1 or FORM 2 is selected the user can set the information to be printed on each line of the form. Pressing the [Up] or [Down] keys will cycle through the options available. The options are:	
INStid	Instrument ID number
Ser no	Serial Number
tImE	Time
dAtE	Date
nEt	Net Weight (Gross weight – Tare Weight)
grOSS	Gross Weight
tArE	Tare Weight
Unit	Unit weight in parts counting mode
COUNT	Number of items in parts counting mode
REF	100% weight in percent weighing mode
PER[	Percentage of reference weight in percent weighing

LO LIM	Low Limit when check weighing
HI LIM	High Limit when check weighing
[r Lf	Inserts a blank line
END	Signifies the end of the report When END is entered the display returns to the RS-232 Sub-menu

Enter the data to be printed on the first line by pressing the **[Up]** or **[Down]** key to cycle through the options. If the current information is OK then press the **[Setup]/Enter** key to move to the next line.

e.g. "LInE 1", "DATE" - prints date

Select a code for one of the pre-set data formats as detailed above.

The next line shows: "LINE 2" "TIME" - prints time
Only one item can be entered per line.

Continue until the formatting of the form is complete. There are 15 lines of possible data. After the 15th line has been set or "END" has been selected, the balance will return to the RS-232 Sub-menu.

Press **[Mode]** to advance to setting of the next menu or press **[→0/T←]** to return to normal weighing.

Remote Display Option

To enable the Remote Display unit, the REMOTE parameters should be set to REMOTE ON.

The REMOTE OFF will disable the remote display.

Details of the baud rate, parity, format of the data output when REMOTE ON is selected will be determined at a later date.

Data will be a string of characters that control the symbols on the display followed by the weight (or other main reading from the balance such as count or density) and weighing unit is ASCII characters.

For example ABCD ±123.4567_dwt<cr><lf>

Where the characters ABCD will control which symbols are on/off on the remote display. How many characters and what the details are will be determined as we go.

13.5 SETUP PARAMETERS

The user parameters that control the balance are shown under the setup menu. When "SEtuP" is displayed, press the **[Setup]** key. The options for each parameter can be scrolled through by using the **[Up]** or **[Down]** key.

TIME 12:23:34	Set Time using the keypad numeric entry method.
DATE	Set Date using the keypad numeric entry method.

FORM EUROPE 01:03:14(dd/mm/yy) USA 03:01:14(mm/dd/yy)	
INST ID 123456	Enter a user number to identify this balance
BUZZER Bu on Bu Off	On= Enable OFF= Disable
BACKLT BI 2	Set level from 0 to 5. 0=Off, 5 = on maximum brightness. Always on unless balance is not used for 5(?) minutes, then turns off automatically until key is pressed or weight >20d is detected. Default brightness is 2
POWER Pw off Pw on Pwon 5	Set the time after which the unit will go into Stand-by power settings, On=Enable, OFF=Disable, If set to On- the options are 1 to 9 minutes
FILTER FI 5	Set a value for the amount of filtering to be done ranging from 1 to 10. A larger number means more filtering and a slower response.
STABILE stab 5	Set a value to be used to determine balance stability, set a value of 1, 2, 5 or 10d. A larger number corresponds to a larger stable zone. Default is 5
AUTO ZERO Az 1	Can be set to On or OFF to enable the auto-zero function. If set to On- select from 1, 2 or 5d
Dec pt Dp pnt	Set decimal point on the display to be a point or a comma. Also on the serial interface. Show text and set decimal points on the LCD to show the selection.

The sub-menu is entered by pressing **[Setup]** –

Use the **[Up]** and **[Down]** keys to increase or decrease the value for setting. Press **[Setup]** to accept the setting and advance to the next item in the menu

Press **[Mode]** to advance to setting of the next parameter or **[→0/T←]** to return to normal weighing

13.6 CALIBRATION SETUP

This menu allows the user to set the calibration parameters.

Press **[Setup]** when “**CAL SET**” is displayed to select the calibration parameters

The options for each parameter can be scrolled through by using the **[Up]** or **[Down]** key

ENABLE En on En off	NO =operator calibration is disabled YES=operator calibration is enabled
CAL REPORT Cr on Cr off	On = Enabled. Prints out Calibration report after successful calibration OFF = Disabled
TIME CAL Tic on Tic 4 Tic off	On = Enabled. Select time from 1 to 24 hours. Default setting is 4 hours OFF = Disabled
TEMP CAL Tpc on Tpc 1.5 Tpc off	On = Enabled. If set to On, set the temperature variation from 0.2 to 4°C OFF = Disabled

Press **[Mode]** to advance to setting of the next menu which is “PASSC” or **[→0/T←]** to return to normal weighing.

13.7 PASSCODES

To enable the security features in this balance it is necessary to set passcodes. There are 2 passcodes called Operator Passcode and Supervisor Passcode. The Operator Passcode allows an authorised user to operate the basic weighing functions of the balance but will not allow access to the Supervisor Menus if the Supervisor Passcode has been set.

To change or disable a Passcode it will be necessary to enter the current passcode.

Press **[Setup]** when “PASSC” is displayed to enter this section.

PC OPER -----	Enter the current passcode (OLD) first then enter a new passcode if desired. A passcode set to zero will disable the security feature and allow unlimited access.
Pc SUPE -----	First enter the current passcode (OLD) and then enter a new passcode if desired. A passcode set to zero will disable the security feature and allow unlimited access.

Forgotten Passcodes

Keep a record of the passcode to ensure you can access this section again. If however you have forgotten your passcode you can still gain access by entering a universal code.

If you have forgotten the current passcode a code of “15” will always allow you to enter the Supervisor area.

Using the Supervisor menus go to PASSCODE section. Reset the operator or Supervisor passcode using the “15” code as the old number when asked.

14 PERIPHERALS

The peripherals that can be used with the balance are the following:

14.1 DENSITY DETERMINATION KIT

(For 0.0001 g units only)

The Density Determination Kit includes everything needed to carry out precise and repeatable measurement. The kit allows a sample to be weighed in air and then a liquid to determine the density of the sample. It also allows a glass sinker of known volume to be weighed in air or in a liquid, to determine the density of the liquid.

14.2 ANTI-VIBRATION TABLE

The anti-vibration table is a support for laboratory balances that isolate the balance from vibration through the floor. The table has a granite surface for the balance with a separate table top surrounding the balance.

14.3 THERMAL PRINTER

A compact thermal printer is available which is ideal for use with laboratory balances.

14.4 REMOTE DISPLAY

A remote display can be connected for users that require this feature.

15 SAFETY AND MAINTENANCE

CAUTION

Use the AC adapter designed by the manufacturer for the balance. Other adapters may cause damage to the balance.

Avoid subjecting the balance to rough treatment or shocks during transport, setting up and operation. Do not overload the balance beyond its maximum capacity, and do not drop material onto the platform which could damage the balance.

Do not spill liquids on the balance as it is not water-resistant. Liquids may damage the case and if it gets inside the balance it may cause damage to the electronics. Use of our special transparent in-use protective covers is recommended.

Material that has a static electric charge could influence the weighing. Discharge the static electricity of the samples, if possible. Another solution to the problem is to wipe both sides of the pan and the top of the case with an anti-static agent.

16 TROUBLE-SHOOTING

Service of a balance will generally be necessary when it does not perform as expected. The balances are not user-serviceable. For Service Information, see section 18.0 and contact your supplier for support.

Problems usually fall into one of the following categories:

User Problems:

The user is asking the balance for something it cannot do or is confused by the modes and functions of a balance. It is also possible the user has set a parameter that has affected the balance operation. Resetting the parameter to a normal value will restore operation.

- **Mechanical Problems**

The balances consist of complicated and fragile mechanical devices. They can be damaged by placing a weight on it which is too high for the balance or by dropping the balance or occasionally shipping it without taking care. The most fragile parts are the flexures. Dust, dirt, spills and other foreign objects in the balance can also cause problems.

- **Electronic Problems:**

These are the rarest of the problems affecting balances. If an electronic problem is suspected make sure the mechanical problems that can cause similar symptoms have been eliminated before attempting electronic repairs. With the exception of cables most electronic repairs are solved by board replacement.

The trouble-shooting table in section 16.1 is a guide of common problems and their solutions. Note that many problems may have multiple solutions and there may be problems found that are not listed in the table. For service information, please contact your supplier.

16.1 TROUBLE-SHOOTING GUIDE.

BALANCE DOES NOT FUNCTION		
Problems	Possible causes	Suggestions
The balance is dead when power is applied	Power supply failure	Check adapter is working Check adapter is correct for the balance Normal adapter is 18VDC, 830mA. *Power supply circuit board failure *Short circuit on any circuit board
The display does not turn on but the calibration motor moves when power is applied	Power is getting to balance, display is not working	*Display cables may be faulty *Display module failure
The display stays on the initial test screen when power is applied. Calibration weight motor is on.	Unstable balance Balance not working correct Power supply	*Check if balance is stable by using service menu and view A/D values Put draught shield over pan Check power supplies
BALANCE WORKS BUT IS NOT STABLE		
Balance is unstable by a few divisions	Noise or vibration from environment Friction in mechanics	Check the balance is positioned correctly to avoid vibration, wind or air movement, it is on a solid table, It is not near sources of heat or cool air, Check balance with weights if problem occurs when sample is used. Static electricity on the samples can cause drifting and instability. Check the area around the weighing pan for hair, dust, obstructions under the pan, *A complete inspection of the mechanics to look for sources of friction may be needed.

Balance is very unstable and does not weigh correctly	Mechanical problems Balance programming Electronic problems	*A complete inspection of the mechanics to look for sources of friction. *Verify the A/D is also unstable. If the A/D is OK then suspect the programming of the balance. Reset parameters, check linearity and redo the calibration. Some electronic problems can also cause this. But all mechanical problems must be resolved first.
BALANCE IS NOT ACCURATE		
You must have accurate and trusted weights to test a balance. If you suspect that the balance is not accurate then you must know your weights are accurate. A balance calibrated using a bag of flour is not accurate even if it works OK otherwise.		
Balance is not accurate	Repeatability Eccentric loading Linearity	Verify the balance shows the same value when the same mass is placed on the centre of the pan for a few tests. Verify the balance shows the same reading (within a tolerance depending upon the model) when a mass is placed at positions around the pan. Verify the balance is acceptable throughout the weighing range. The balance must give acceptable readings from low weights up to the capacity.
Poor Repeatability	Usually a mechanical problem.	Inspect the area around the pan for hair, dust or other obstructions, *Inspection of the mechanics may be needed for any possible problems.
Poor Eccentric Loading	A mechanical problem	Inspect the area around the pan for hair, dust or other obstructions, *Inspection of the mechanics may be needed for any possible problems. *Readjusting of the Eccentric Loading is recommended.

Poor Linearity	Usually a mechanical problem Electronic Problems	Re-check repeatability *Inspection of the flexures for damage or loose hardware may be required *Use the Linearity Function in the service menu to reset linearity *A problem in the analogue circuit board or power supplies can cause poor linearity. Make sure all mechanical problems have been eliminated first
OTHER PROBLEMS:		
Cannot calibrate	Zero shifted more than allowed Calibration timeout	*Check all flexures for damage *Reset dealer calibration *Verify linearity and repeatability *The balance may be unstable. Verify stability as above.
Calibration weight motor does not stop		*Check the cables to the motor, try plugging the balance into the power again *Look for friction in the calibration weight movement *Check the opto-coupler that controls the motor position.
RS-232 not working	Doesn't print	Check parameters match the device connected Verify cable is correct *RS-232 circuits damaged
Display dark, keys beep	Display contrast poor Cable unplugged or damaged	*Check the cables to the display *Replace the display which could be damaged

*To be carried out by authorised technicians only.

17 REPLACEMENT PARTS AND ACCESSORIES

If you need to order any spare parts and accessories, contact your supplier. A partial list of such items is as follows:-

Power Supply Module
Stainless Steel top Pan
Below Balance Hanger
Density Determination Kit
In-use protective cover

Anti-Vibration Table
Security Lock and Cable
Dust Cover
Printers, etc.

Note: Not all items are available for all models

18 SERVICE INFORMATION

This manual covers the details of operation. If you have a problem with the balance that is not directly addressed by this manual then contact your supplier for assistance. In order to provide further assistance, the supplier will need the following information which should be kept ready:

A. Details of your company

- Name of your company:
- Contact person's name:
- Contact telephone, e-mail,
- Fax or any other methods:

B. Details of the unit purchased

(This part of information should always be available for any future correspondence. We suggest you to fill in this form as soon as the unit is received and keep a print-out in your record for ready reference.)

Model name of the balance:	
Serial number of the unit:	
Software revision number (Displayed when power is first turned on):	
Date of Purchase:	
Name of the supplier and place:	

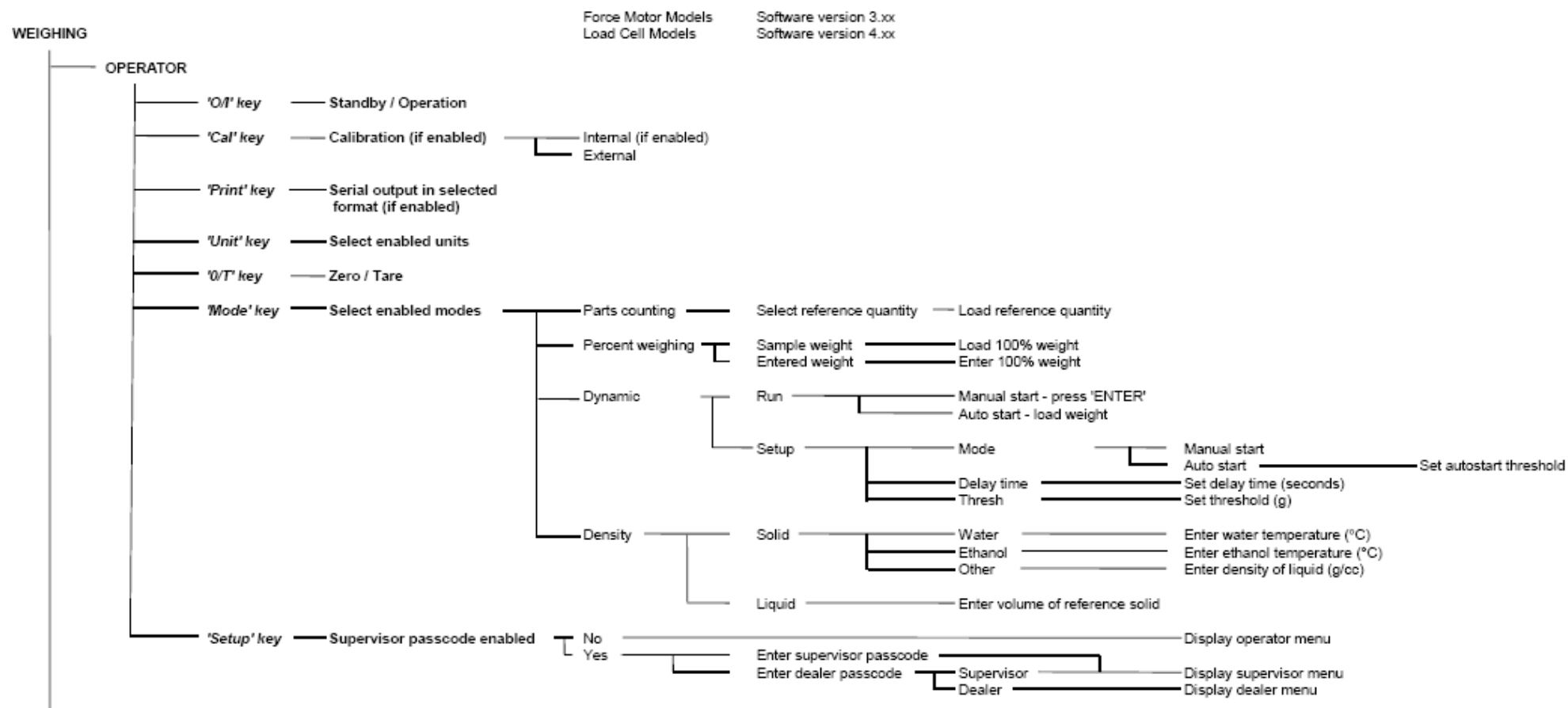
C. Brief description of the problem

- Include any recent history of the unit. For example:
- Has it been working since it was delivered
 - Has it been in contact with water
 - Damaged from a fire
 - Electrical Storms in the area
 - Dropped on the floor, etc.

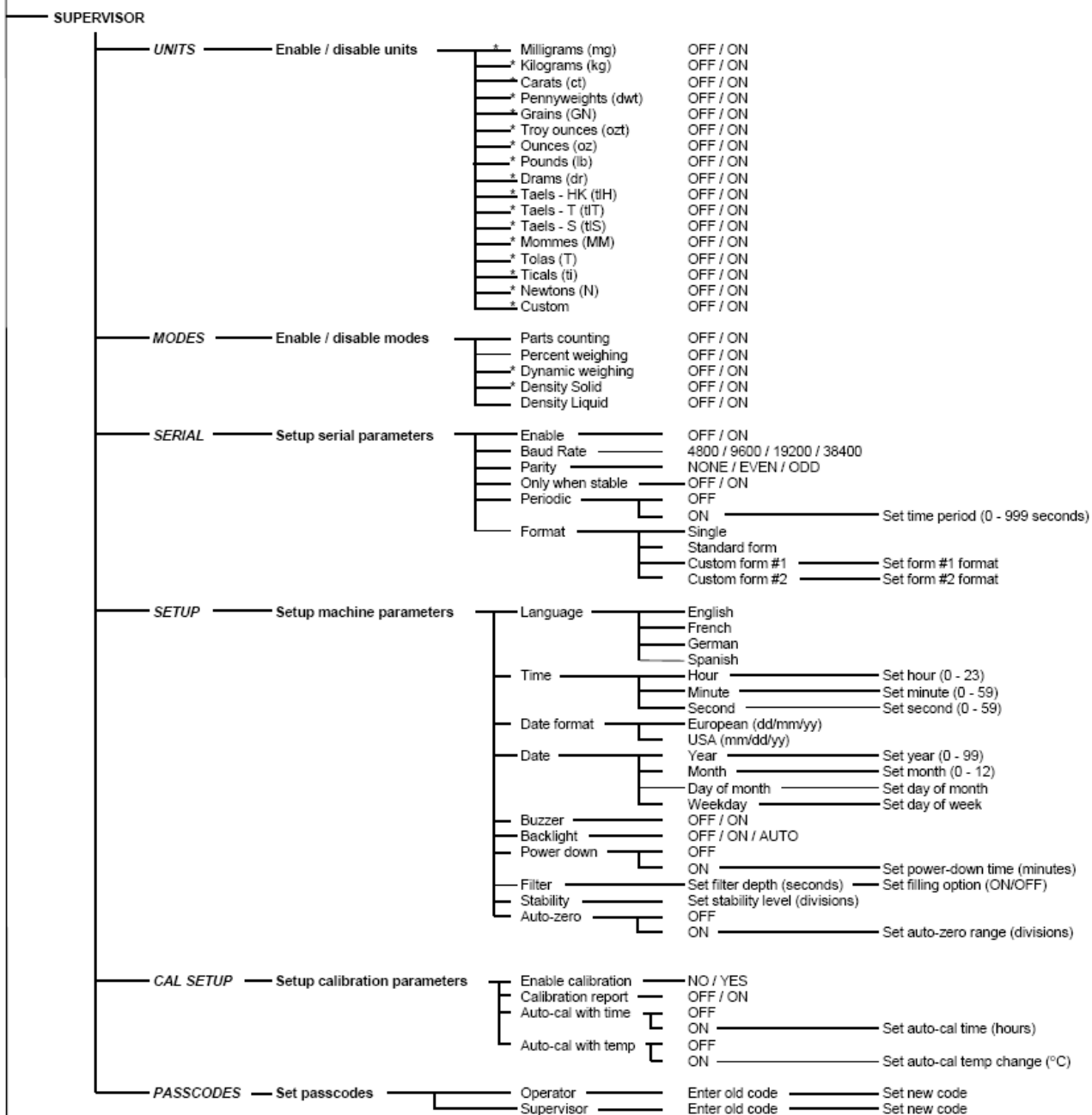
19 BALANCE MENU STRUCTURE

OPERATOR MENU STRUCTURE

Note: Some menu options are not available, or extra options may be visible depending on if the model is internal or external calibration type, and whether it is an approved model. Conditions of approval in some countries necessitates adding or removing some options from the user interface.



SUPERVISOR MENU STRUCTURE



20 WARRANTY INFORMATION

The manufacturer offers Limited Warranty (Parts and Labour) for any components that fail due to defects in materials or workmanship. Warranty starts from the date of delivery.

During the warranty period, should any repairs be necessary, the purchaser must inform its supplier or manufacturer. The company or its authorised technician reserves the right to repair or replace the components at the purchaser's site or any of its workshops depending on the severity of the problems at no additional cost. However, any freight involved in sending the faulty units or parts to the service centre will be borne by the purchaser.

The warranty will cease to operate if the equipment is not returned in the original packaging and with correct documentation for a claim to be processed. All claims are at the sole discretion of the manufacturer.

This warranty does not cover equipment where defects or poor performance is due to misuse, accidental damage, exposure to radioactive or corrosive materials, negligence, faulty installation, unauthorised modifications or attempted repair or failure to observe the requirements and recommendations as given in this User Manual.

This product may include a rechargeable battery that is designed to be removed and replaced by the user. The manufacturer warrants that it will provide a replacement battery if the battery manifests a defect in materials or workmanship during the initial period of use of the product in which the battery is installed.

As with all batteries, the maximum capacity of any battery included in the product will decrease with time or use, and battery cycle life will vary depending on product model, configuration, features, use, and power management settings. A decrease in maximum battery capacity or battery cycle life is not a defect in materials or workmanship, and is not covered by this Limited Warranty.

Repair carried out under the warranty does not extend the warranty period. Components removed during the warranty repairs become the company property.

The statutory rights of the purchaser are not affected by this warranty. In the event of dispute then the terms of this warranty are governed by UK law. For complete details on Warranty Information, see the terms and conditions of sale available on our web-site.



Manufacturer's Declaration of Conformity

This product has been manufactured in accordance with the harmonised European standards, following the provisions of the below stated directives:

2004/108/EC, Electro Magnetic Compatibility Directive	Standard EN61326-1:2013, Electrical Equipment for Measurement, Control and Laboratory Use – EMC requirements – Part 1: general requirements.
2006/95/EC, Low Voltage Directive	Standard EN61010-1:2010, Safety requirements for measurement, control and laboratory use equipment – Part 1: General requirements.
2011/65/EC, RoHS, on the Restriction of the use of certain hazardous substances in electrical and electronic equipment	Restricted substances referred to in Article 4(1) and maximum concentration values tolerated by weight in homogeneous materials do not exceed prescribed limits.

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded interconnect cables must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device.
Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

WEEE COMPLIANCE



Any Electrical or Electronic Equipment (EEE) component or assembly of parts intended to be incorporated into EEE devices as defined by European Directive 2012/19/EU must be recycled or disposed of using techniques that do not introduce hazardous substances harmful to our health or the environment as listed in Directive 2011/65/EC or amending legislation.

Battery disposal must be performed according to local laws and restrictions.

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The manufacturer reserves the right to make changes to the technology, features, specifications and design of the equipment without notice.

All information contained within this publication is to the best of our knowledge timely, complete and accurate when issued. However, we are not responsible for misinterpretations which may result from the reading of this material.

The latest version of this publication can be found on the manufacturers' website.

